approximately 10%. The rates of SSI varied depending on the surveillance period, data collection method, and surgical procedure. The incidence of SSI was high for cardiovascular (5–18%) and gastrointestinal (6–16%) surgery. The rates of SSI appeared lower for neurosurgery (0.8–2.5%), although those studies only considered SSI cases before discharge from hospital. Diabetes and obesity were found to increase the risk of SSI by over 70%. Other significant risk factors identified include surgery duration and wound classification. The most common pathogens in SSIs were *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Escherichia coli*. SSIs were found to extend hospital stay by 5–18 days and increase treatment cost by 4–30%. The estimated cost of hospitalization was significantly higher in patients with SSI compared to patients without SSI (29,000 vs. 16,000 rupees, $P < 0.001$). **CONCLUSIONS:** In India, where an estimated 72% of health-care expense is out-of-pocket, the additional cost associated with SSI (treatment, loss of ability to work) represents a significant burden to patients and their families. The increase in hospital stay also lays additional burden to an already resource-constrained health-care system. Interventions aimed at reducing SSI would provide cost-savings and improve the efficiency of the health-care system.

PIN3

SURGICAL SITE INFECTION IN AUSTRALIA: A SYSTEMATIC REVIEW OF THE INCIDENCE AND ECONOMIC BURDEN

Coleman K[1], Tan JT[1], Norris S[1], Hardy K[2], Berg T[2], Metz L[3]
[1]Health Technology Analysts Pty Ltd, Sydney, NSW, Australia; [2]Johnson and Johnson Medical Australia, Sydney, NSW, Australia; [3]Johnson and Johnson Medical Asia-Pacific, Singapore

OBJECTIVES: To conduct a systematic review of literature on the epidemiological and economic burden of surgical site infection (SSI) in Australia. **METHODS:** A literature search of the EMBASE and Medline databases was conducted. The search was limited to 1995–2010 to ensure the pertinence of the data. Searches to identify epidemiological and economic studies were conducted separately. Relevant studies were identified using pre-defined criteria (i.e., reports the rate, risk factors, cost of SSI; conducted in a hospital setting; not an intervention study). **RESULTS:** Thirty-five studies were included in this review. Differences in study design (surveillance period, data collection method, surgical procedure) made it difficult to synthesise data to derive a single estimate of SSI in Australia. The overall incidence of SSI in Australia is approximately 5–10%. However, the rate of SSI varied across different procedures: higher rates were seen following gastrointestinal (~11%) and cardiovascular (6–13%) surgery, while the rates for orthopedic (4.7–8%) and gynecological surgery (2.3–10%) appeared lower. Risk factors identified include diabetes and obesity, which increased the risk of SSI by 60–180%. The National Nosocomial Infections Surveillance (NNIS) risk index was positively correlated with the risk of developing an SSI. The most common organisms identified in SSIs were *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The hospitalization cost attributable to SSI is estimated at approximately AUD$54 million annually. With a large proportion of SSIs occurring after discharge from hospital, the incidence of SSI is likely underestimated. Post-discharge SSI, in turn, increases the burden to community health services. Indirect costs, such as loss of productivity, further add to the economic burden of SSI. **CONCLUSIONS:** The incidence and cost estimates demonstrate that SSI represents a significant burden to the Australian health-care system. Interventions aimed at reducing SSI would provide cost-savings and improve the efficiency of the health-care system.

PIN4

SURGICAL SITE INFECTION IN JAPAN: A SYSTEMATIC REVIEW OF THE INCIDENCE AND ECONOMIC BURDEN

Tan JT[1], Coleman K[1], Norris S[1], Maki A[2], Metz L[3]
[1]Health Technology Analysts Pty Ltd, Sydney, NSW, Australia; [2]Johnson and Johnson Medical K.K., Chiyoda-ku, Tokyo, Japan; [3]Johnson and Johnson Medical Asia-Pacific, Singapore

OBJECTIVES: To conduct a systematic review of literature on the epidemiological and economic burden of surgical site infection (SSI) in Japan. **METHODS:** A literature search of the EMBASE and Medline databases was conducted. The search was limited to 1995–2010 to ensure the pertinence of the data. Searches to identify epidemiological and economic studies were conducted separately. Relevant studies were identified using pre-defined criteria (i.e., reports the rate, risk factors, cost of SSI; conducted in a hospital setting; not an intervention study). **RESULTS:** Thirty-five studies (22 retrospective, 12 prospective and one case-control study) were included. Differences in study design, surgical procedure and surveillance period made it difficult to synthesise data to derive a single estimate of SSI in Japan. The overall incidence of SSI in Japan is approximately 5–10%. The rate of SSI was higher following gastrointestinal surgery (~20%), and lower for cardiovascular (<6.5%) and orthopedic (<1%) surgery. Superficial SSI occurred most frequently accounting for 30–87% of all SSIs. The National Nosocomial Infections Surveillance (NNIS) risk index was positively correlated with the risk of developing an SSI. Procedure-associated risk factors (e.g., surgical technique, surgery duration) were also found to significantly increase the risk of SSI. The most common organisms identified in SSIs were *Staphylococcus aureus* and *Pseudomonas aeruginosa*. None of the studies identified in this review examined the economic burden of SSI in Japan. However, several studies showed that SSIs were associated with a significant increase in ICU and hospital stay (6–27 additional days). **CONCLUSIONS:** SSI represents a substantial burden on the health-care system and patients, mainly attributable to the extended length of stay in hospital and additional cost of treatment required. Consequently, strategies and interventions aimed at reducing the incidence of SSIs could provide cost-savings and improve the efficiency of the Japanese health-care system.

PIN6

COMPARISON OF SOCIO-DEMOGRAPHIC AND CLINICAL FACTORS OF PULMONARY AND EXTRA PLUMONARY TUBERCULOSIS IN YEMEN

Othman GQ, Ibrahim MI
Universiti Sains Malaysia, Penang, Malaysia

OBJECTIVES: The study aimed to assess the clinical and socio-demographic factors associated with pulmonary and extra pulmonary tuberculosis in Yemen. **METHODS:** A cross-sectional study was carried out among 160 Pulmonary Tuberculosis (PTB) and 160 Extra Pulmonary Tuberculosis (EPTB) patients diagnosed and treated in a TB center in Sana'a, the capital city of Yemen. Socio demographic, clinical and laboratory data and types of drug regimen used in treatment were collected from TB patients and medical records from the TB center. Risk factors for EPTB patients and PTB patients were identified through structured questionnaire by interviewing. **RESULTS:** The female to male ratio was 1.2 and 1.6 for PTB and EPTB, respectively. The median age for PTB patients was 28 and 30 for EPTB patients. It was also found that the TB patients with low educational level amounted 52% and 49% in PTB and EPTB respectively. This study illustrated that the majority of smokers were males 64% for PTB and 58% for EPTB, whose age ranging between 15–54 in both PTB and EPTB cases. This study found the extra pulmonary tuberculosis patients diagnosed in private hospital and clinics (41%) more than pulmonary tuberculosis patients (26%) There were significant differences in vaccination in case of employed patients of PTB than non employed patients and educated patients of PTB than non educated patients ($P = 0.02$ and $P = 0.036$) respectively. There was also significant difference in vaccination in case of employed patients of EPTB than nonemployed patients ($P < 0.0001$). **CONCLUSIONS:** In conclusion, female and younger ages were higher in both EPTB and PTB. The EPTB patients diagnosed in private hospital and clinics were more than PTB patients. The EPTB patients have less monthly income than pulmonary TB. Vaccination has strong correlation with education and employment in case of PTB and EPTB patients.

PIN7

ANTIFUNGAL TREATMENT FOR INVASIVE CANDIDIASIS: SYSTEMATIC REVIEW AND META-ANALYSIS

Oh JJ[1], Hwang JA[2], Ko SK[1]
[1]Pfizer Pharmaceuticals Korea Ltd, Seoul, South Korea; [2]Korea Environment Health Institute, Seoul, South Korea

OBJECTIVES: This study aimed to compare the effects of different antifungal therapies for invasive candidiasis. **METHODS:** Literature searches through MEDLINE, and the Cochrane Database were performed with the following search terms: names of specific antifungal agents, candidiasis and candidemia, from inception to December 2009. We included all randomized controlled trials (RCT), observational studies, cohort studies and review articles that compared different antifungal agents for the treatment of invasive candidiasis and other form of candidiasis. Then we performed a meta-analysis with extracted RCTs. The primary outcome was treatment success and the secondary outcome was all-cause mortality. Relative risks (RRs) with 95% confidence intervals (Cis) were pooled. **RESULTS:** Through systematic review (SR), a total number of nine RCTs, four SR and meta-analysis, one observational study were extracted. Meta-analysis included nine RCTs enrolling a total of 1527 patients. For primary analysis of treatment success, we pooled 5 trials comparing fluconazole to amphotericin B, Relative Risk (RR) 0.92 (95% CI, 0.81–1.03). We also pooled two trials of amphotericin B versus echinocandins and yielded a RR of 1.00 (95% CI, 0.90–1.10). One study compared anidulafungin to fluconazole resulting in a RR of 1.26 (95% CI, 1.06–1.51) in favor of anidulafungin. For all-cause mortality analysis, five trials assessing fluconazole to amphotericin B were pooled and yielded a RR of 0.84 (95% CI, 0.64–1.12). The pooled RR of two trials comparing amphotericin B to echinocandins was 0.95 (95% CI, 0.73–1.23). Anidulafungin versus fluconazole resulted in a RR of 0.73 (95% CI, 0.48–1.10). **CONCLUSIONS:** All assessed antifungal agents showed similar efficacy on treatment success and all-cause mortality, but anidulafungin revealed the significant high rate of treatment success compared to fluconazole.

PIN8

CLINICAL EFFECTIVENESS OF THE SEASONAL INFLUENZA VACCINE IN HEALTHY INDIAN CHILDREN

Singh H[1], Gupta G[2], Tiwari P[3]
[1]National Institute of Pharmaceutical Education and Research (NIPER), S.A.S. Nagar, Sec-67, Punjab, India; [2]Charak Care Clinics, Mohali, Punjab, India, [3]National Institute of Pharmaceutical Education and Research, Mohali, Punjab, India

OBJECTIVES: To evaluate the clinical effectiveness of the 2009–2010 seasonal influenza vaccine in preventing Influenza-like illness (ILI) in healthy Indian children of age 6 months to 18 years. **METHODS:** A prospective observational cohort study was carried out from September, 2009 to February, 2010, at a private outpatient pediatric setting in Northern India. All the enrolled children were followed monthly through telephonic interview of their parents for development of ILI. The visits to physician for any acute respiratory tract infection (ARI) were also recorded. ILI was defined as per ICD-10. Children having one shot and two shots of influenza vaccine were defined as partially vaccinated and fully vaccinated, respectively. Multiple logistic regression was used to calculate the association between vaccination status and ILI. **RESULTS:** A total of 294 children, vaccinated cohort (N = 153) and unvaccinated cohort (N = 141) were enrolled in the study. There was a statistically significant reduction in ILI (OR 0.57 [0.33–0.99], $P < 0.05$) and visits to physician for ARI (OR 0.42 [0.22–0.79],

$P < 0.05$) among fully vaccinated children (n = 101) when compared to unvaccinated children (n = 141). Secondly, there was no significant reduction in ILI and visits to physician among partially vaccinated children (n = 52) versus unvaccinated children (OR 1.54 [0.77–3.07], $P = 0.24$ and OR 1.81 [0.65–5.27], $P = 0.30$) respectively. **CONCLUSIONS:** Based upon these findings, it is concluded that seasonal influenza vaccine is effective in reducing the ILI and visits to physician for ARI among fully vaccinated Indian children. Partially vaccinated children had no statistically significant protection against ILI and visits to physician. To the best of our knowledge, this is the first report on the clinical effectiveness of seasonal influenza vaccine in healthy Indian children.

PIN9

EFFICACY AND SAFETY OF RALTEGRAVIR IN TREATMENT NAIVE HIV+ PATIENTS: A MIXED TREATMENT COMPARISON APPROACH

LeReun C[1], Tilden D[2], Harvey C[3], Price B[3], van Bavel J[3]

[1]Independent Biostatistician, Carrigaline county, Cork, Ireland; [2]THEMA Consulting Pty Ltd, Pyrmont, NSW, Australia; [3]MSD, Sydney, NSW, Australia

OBJECTIVES: To assess the efficacy and safety of raltegravir (integrase strand transfer inhibitor) compared to non-nucleoside reverse transcriptase inhibitors (nevirapine, efavirenz) and protease inhibitors (lopinavir, atazanavir) in treatment-naive patients with HIV infection. **METHODS:** A systematic literature search identified seven treatment naïve trials comparing raltegravir to other treatments of interest via the common comparator efavirenz. This network of evidence was analyzed using a Mixed Treatment Comparison (MTC). Selected outcomes were the proportion of patients with plasma HIV RNA less than 50 copies per mL at 48 weeks (efficacy) and discontinuations (safety). A Bayesian approach was chosen and implemented in WinBugs. Fixed-effect and random-effect models were run and the most appropriate model was selected based on the performance of the Monte Carlo simulations and the Deviance Information Criterion. Results were reported as median odds ratio, relative risk, and risk difference of raltegravir versus each comparator and associated 95% credible intervals. Bayesian inference also allows for treatment to be ranked, by calculating the proportion of simulations in which this treatment performs "best" in terms of relative efficacy/safety. **RESULTS:** For both efficacy and safety outcomes the fixed-effect models were preferred. Efficacy results showed a significant advantage of raltegravir compared to atazanavir, lopinavir, and nevirapine. Raltegravir also performed numerically better than efavirenz, and overall had a 71% probability of being the more efficacious treatment on this outcome. Safety results also favored Raltegravir, but significance was only reached compared to nevirapine. **CONCLUSIONS:** The MTC suggests that raltegravir has an advantage that is at least numerical and in some cases statistically significant over its comparators in term of achieving plasma HIV less than 50 copies per mL and avoiding discontinuation, providing additional data that supports the use of raltegravir in this indication.

PIN10

A SYSTEMATIC REVIEW OF THE ATTRIBUTION OF HUMAN PAPILLOMAVIRUS TYPES AMONG CERVICAL INTRAEPITHELIAL NEOPLASIA AND CERVICAL CANCERS IN JAPAN BY SAMPLING METHODS

Kimura T

Banyu (Merck), Tokyo, Japan

OBJECTIVES: Estimating vaccine effectiveness is crucial for policymakers. Human Papillomavirus (HPV) type-specific attribution to cervical cancers and precancers is one key factor in this regard for HPV vaccination and cancer screening. Among a number of reports on HPV type prevalence, only a few investigated attributions considering multitype infections and sampling methods. The objective of this study was to elucidate HPV type-specific attribution in Japanese women. **METHODS:** A systematic review of published studies was conducted. Sampling methods were divided into two categories: one group consists of studies where HPV DNA was extracted from exfoliated cells, and another group consists of those using tissue specimens obtained by biopsy or surgical resection. To elucidate interrelationships among multiple HPV types in contributing to lesion development, attribution of each HPV was estimated assuming a fractional allocation of multitype infection. **RESULTS:** The overall positivity for any HPV was consistently higher in the exfoliated-cell group. On the other hand, attribution of HPV types 16 and 18 to cervical lesions was nominally higher in the tissue-specimen group. Attribution of HPV types 16 and 18 to cervical squamous cell carcinoma (SCC) was estimated as 47.4% (95% CI: 43.8–51.1) and 9.4% (7.5–11.7) in the tissue-specimen group and 43.3% (38.5–48.2) and 7.6% (5.4–10.6) in the exfoliated-cell group, respectively. **CONCLUSIONS:** HPV positivity was higher in the exfoliated-cell group while type 16/18 attribution was nominally higher in the tissue-specimen group. Attribution of HPV type 16 to SCCs and adenocarcinomas (AC) derived from tissue specimens, after adjustment for multitype infections, was ~20% lower in Japanese women compared to data previously reported for US women. Type 18 attribution in Japanese women was similar to the United States for SCC and 10% lower for AC.

INFECTION – Cost Studies

PIN11

COST ANALYSIS OF ADVERSE DRUG EVENTS GROM GPO-VIR®S AND GPO-VIR®Z IN PEOPLE LIVING WITH HIV/AIDS IN THAILAND

Srimongkon P[1], Supakul S[2], Lucksiri A[2], Permsuwan U[2]

[1]Mahasarakham University, Kantharavichai, Mahasarakham, Thailand; [2]Chiang Mai University, Muang, Chiang Mai, Thailand

OBJECTIVES: GPO-VIR® S (Stavudine, Lamivudine, Navirapine) has been used in people living with HIV/AIDS in Thailand since 2002. Drug resistance and adverse drug events (ADEs) are likely to be found. To solve this problem, GPO-VIR® Z (Zidovudine, Lamivudine, Navirapine) has been developed since 2005. Therefore, this study was conducted to evaluate the cost of ADEs found in people living with HIV/AIDS receiving GPO-vir® S compared with GPO-vir® Z. **METHODS:** A retrospective cohort study design was used to determine the ADE costs of GPO-vir® S and GPO-vir® Z based on provider's perspective. Direct medical costs (i.e., drug, laboratory, hospitalization, administration etc.) were directly collected from patient profiles from March 2005 to May 2008 at Nakornping hospital, Chiangmai province, Thailand. Total cost and average cost per ADE were calculated. **RESULTS:** A total of 136 patients were studied. Of those, 95 cases received GPO-vir® S and 41 cases received GPO-vir® Z. Total ADEs found were 57 and 14 in GPO-vir® S and GPO-vir® Z groups respectively. Lipodystrophy (52.6%) was mostly found in GPO-vir® S group while anemia (28.7%) was found in GPO-vir® Z group. The total cost was 923,971 baht and 65,594 baht in GPO-vir® S and GPO-vir® Z respectively. An average cost per event in GPO-vir® S group was 16,210 baht and GPO-vir® Z group was 4686 baht. **CONCLUSIONS:** Although treatment with GPO-vir®Z seems to present lower costs of ADEs, selection of drug regimen still need to depend on the symptoms of individual patient.

PIN12

COST-OF-ILLNESS OF CHRONIC HEPATITIS B INFECTION IN VIETNAM

Tu HAT[1], Riewpaiboon A[2], Woerdenbag HJ[1], Postma MJ[1], Li SC[3]

[1]University of Groningen, Groningen, The Netherlands; [2]Mahidol University Faculty of Pharmacy, Bangkok, Thailand; [3]University of Newcastle, Callaghan, NSW, Australia

OBJECTIVES: To quantify the financial burden of chronic hepatitis B (CHB) infection and its complications in a cost-of-illness study in Vietnam, a highly endemic country of hepatitis B virus (HBV) infection. **METHODS:** The study adopted the micro-costing approach. For direct medical cost estimation, data were retrieved retrospectively from medical histories of inpatients and outpatients with various CHB infection stages in 2008 from a large referral hospital in Vietnam. For direct nonmedical and indirect cost estimation, data were obtained from outpatients from the same hospital through face-to-face interviews. One- and two-way analyses were performed on the cost calculated. **RESULTS:** In 2008, the total cost of CHB infection and its complications was estimated to be around US$ 10 billion, with 80% contributable to direct medical cost. Antivirals were the major cost driver in treating CHB infections. The per-patient total annual direct medical cost increased with the severity of the disease with the cost amounted to US$ 943.64 for CHB and US$ 3916.21 for hepatocellular carcinoma. Based on the results, if all Vietnamese patients received treatment for CHB infections, the estimated cost would be twice as much as the total health budget of Vietnam, highlighting that a significant proportion of CHB infections in Vietnam are not being treated, and the patients are bearing the extra cost out-of-pocket, or seeking treatment from traditional medicines. **CONCLUSIONS:** This study confirms that chronic HBV infection poses an unbearable financial burden for the average patient with a GDP per capita of around $1024, and the lack of access to treatment is a social issue in Vietnam. Although universal newborns vaccination against HBV has been implemented to reduce the number of infected subjects, more health-care investment to improve access and provision of affordable medications by re-examining pharmaceutical policies to attain equity in proper treatment for patients with CHB infections would be needed.

PIN13

BURDEN AND MEDICAL COSTS OF ANOGENITAL WARTS IN BANGKOK, THAILAND

Dhitavat J[1], Charoenwatanachokchai A[2], Kongsin S[1], Kaewkungwal J[1], Ruengkris T[2], Bussaratid V[1], Pitisuttithum P[1]

[1]Mahidol University, Bangkok, Bangkok, Thailand; [2]Ministry of Public Health, Bangkok, Bangkok, Thailand

OBJECTIVES: 1) Assess the proportion of anogenital warts to the total number of Sexual Transmitted Infection (STI); and 2) Quantify the direct medical costs of anogenital warts from patient perspective. **METHODS:** A prospective observational study was conducted in STI Clinic at Bangrak Hospital, Bangkok, Thailand from June 2008–September 2009. The proportion of anogenital warts to the total number of STI was calculated from the database of Bangrak Hospital. A total of 131 patients with clinically diagnosed anogenital warts were recruited. After baseline assessment, the patients had three additional follow-up-visits at day 7, month 1, and month 3. On each visit, patients were examined and interviewed for health-care costs, work productivity loss and activities impairment. At month 6, telephone assessment for the signs of disease recurrence was done. Patients were treated according to standard medical practice. **RESULTS:** The proportion of anogenital warts to the total number of STI in 2008 was 14.6%. The mean age (SD) of the study subjects was 28.2 years (7.4 years). Males and females were approximately equal (males 51.9%, female 48.1%). Most of them were employed (51.1%), the rest were sex workers (25.2%),